

Role of Cyclical Negative Pressure Wound Therapy in Post-Traumatic Raw Area

Kishore Kumar U¹, Ravi Kumar Chittoria², Jacob Antony³

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Abstract

Negative pressure wound therapy is shown to improve tissue blood flow and tissue oxygen saturation. Application of negative pressure causes subtotal capillary occlusion, which acts as a stimulus for post occlusive reactive hyperaemia. This promotes wound bed granulation, contraction of wound margins and reduction of bacterial load. There are 3 modes of applying negative pressure: continuous, intermittent and cyclical. The aim of this article is to assess the role of cyclical negative pressure wound therapy in management of raw post traumatic wounds.

Keywords: Cyclical Negative Pressure Wound Therapy; Post Traumatic Raw Area; Wound.

INTRODUCTION

Management of chronic non-healing wounds poses a challenge improving the general condition of the patient, adequate dressing of the wound and planning for coverage of the wound. Apart from wound cleaning and dressing, one of the available methods of wound care is negative pressure wound dressing which utilises a vacuum

device to create negative pressure over the wound, which then improves the wound blood supply, improves wound granulation and removes exudates.¹ The cyclic method is found to be less painful than intermittent method, as it does not cause a rapid increase in pressure; and has superior effects on tissue perfusion compared to continuous and intermittent method.

MATERIALS AND METHODS

The study is done in a tertiary care hospital in South India. The subject is a 22 year old male patient, with no comorbidities, with a history of injury to right upper limb by a cement machine 2 months back. On examination, the patient's vitals were stable. On local examination a grossly contaminated wound extending from right shoulder to right hand was present with exposed congested muscles, exposed ends of fractured humerus, impaired distal sensation and distal pulses, and cold and

Author's Affiliations: ¹Junior Resident, Department of General Surgery, ²Professor, Department of Plastic Surgery and Telemedicine, ³Senior Resident, Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education and Research Institute, Puducherry 605006, India.

Corresponding Author: Ravi Kumar Chittoria, Professor, Department of Plastic Surgery & Telemedicine, Jawaharlal Institute of Postgraduate Medical Education and Research Institute, Puducherry 605006, India.

E-mail: drchittoria@yahoo.com

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paralysed upper limb. He underwent right above elbow guillotine amputation on the same day, and wound care was given in the form of daily Eusol dressings. 24 days after the injury, he was admitted for management of the non-healing wound over the right upper arm stump (fig. 1). Split skin grafting from right thigh was used to cover the raw area and Cyclical NPWT two sessions (Fig. 2) were done.



Fig. 1: Post traumatic raw area right upper limb stump



Fig. 2: Cyclical negative pressure wound therapy (CNPWT)

RESULTS

CNPWT is useful in reducing size of the wound and improves wound healing in our patient. (Fig. 3).



Fig. 3: Improved post traumatic raw area wound after CNPWT

DISCUSSION

Negative pressure wound therapy is shown to improve tissue blood flow and tissue oxygen saturation. Application of negative pressure causes subtotal capillary occlusion, which acts as a stimulus for post occlusive reactive hyperaemia.² This promotes wound bed granulation, contraction of wound margins and reduction of bacterial load. There are 3 modes of applying negative pressure: continuous, intermittent and cyclical.³ In continuous mode, a constant sub-atmospheric pressure of 125 mmHg is applied. In intermittent mode, 5 minutes of -125 mmHg applied followed by 2 minutes of 0 mmHg. In cyclic mode, the pressure oscillates between 0 and -125 mmHg.⁴ Intermittent mode is found to be superior to continuous mode in terms of effectiveness however it is associated with pain with each cycle of application of pressure.⁵ The cyclic method is found to be less painful than intermittent method, as it does not cause a rapid increase in pressure; and has superior effects on tissue perfusion compared to continuous and intermittent method.⁶ Both the intermittent and the cyclic mode require specific machines to generate intermittent and cyclic suction respectively and thus may not be feasible to use with classic suction devices available in most hospitals which give continuous suction. Hence, continuous mode NPWT is commonly used in most cases.⁷

CONCLUSION

Cyclic negative pressure wound therapy is found to be effective in improving wound healing in post-

traumatic raw area, by enhancing the blood supply and tissue oxygenation.

Conflicts of Interest

This study does not require any institutional approval.

Declarations

Authors' contributions

All authors made contributions to the article.

Availability of data and materials

Not applicable

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Not applicable

REFERENCES

1. Argenta LC, Morykwas MJ. Vacuum-assisted closure: a new method for wound control and treatment: clinical experience. *Ann Plast Surg* 1997;38:563-76 discussion 577.
2. Morykwas MJ, Argenta LC, Shelton-Brown EL, McGuirt W. Vacuum-assisted closure: a new method for wound control and treatment: animal studies and basic foundation. *Ann Plast Surg* 1997;38:553-62.
3. Glass GE, Nanchahal J. The methodology of negative pressure wound therapy: separating fact from fiction. *J Plast Reconstr Aesthet Surg*. (2012) 65:989-1001.
4. Kairinos N, Voogd AM, Botha PH, Kotze T, Kahn D, Hudson DA, *et al*. Negative-pressure wound therapy II: negative-pressure wound therapy and increased perfusion. Just an illusion? *Plast Reconstr Surg*. (2009) 123:601-12.
5. Borgquist O, Ingemansson R, Malmström M. Wounded edge microvascular blood flow during negative pressure wound therapy: examining the effects of pressures from -10 to -175 mmHg. *Plast Reconstr Surg*. (2010) 125:502-9.
6. Kairinos N, McKune A, Solomons M, Hudson DA, Kahn D. The flaws of laser Doppler in negative pressure wound therapy research. *Wound Repair Regen*. (2014) 22:424-9.
7. Muenchow S, Horsch RE, Dragu A. Effect of topical negative pressure therapy on perfusion and microcirculation of human skin. *Clin Hemorheol Microcirc*. (2019) 72:365-74.